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Lando & Anastasi, LLP
Z2002

One Main Street
Suite 1100
Cambridge, MA 02142

EXAMINER

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NOTIFICATION DATE

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ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

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docketing@LALaw.com
gengelso@LALaw.com

DETAILED ACTION

1. This application is responsive to application number (10/539684) filed on January 12, 2006. Claims 1, 8, 11, 12, 17, 26, 38, 44, 49, 72, 73, 77, 78, and 80 are pending and have been examined.

Response to Arguments

2. Applicant's arguments filed December 06, 2010 have been fully considered but they are not persuasive.

The applicant argues that Le Pennec does not teach signal warping (Remarks of December 06, 2010, page 15 lines 4 – 31). The examiner respectfully disagrees. Warping to the examiner's understanding dealings with the geometrical properties of a signal as it is being processed. Le Pennec clearly discloses this information when he is referring to the trajectory (i.e a property of geometrical value) and the geometric processor.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2482

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1, 7, 8, 12, 17, 38, 44, 49, 72-73, and 77-78 rejected under 35 U.S.C. 103(a) as being unpatentable over Le Pennec et al (US 6,836,569, hereafter Le Pennec) in view of Washizawa (US 5,917,943).

As per **claim 1**, Le Pennec discloses a method of processing n-dimensional digital signals, n being an integer at least equal to 1, comprising the steps of:

(a) receiving an n-dimensional digital input signal (Fig 1 element 101; column 7 lines 18 – 22; Le Pennec is describing an n-dimensional digital input signal and further is Le Pennec describes being received by a system);

(b) computing an n-dimensional warped signal from said n-dimensional digital input signal, the n-dimensional warped signal including n-dimensional warped coefficients and n-dimensional signal warping grids (Fig 1 element 110; column 7 lines 18 – 24 and 60 - 65; the examiner knowledge of warping deals with geometric transformation which Le Pennec describes in the prior art); and

(c) computing warped wavelet packet coefficients and wavelet packet warping grids by applying an n-dimensional warped wavelet packet transform to said warped signal (column 7 lines 28 – 38).

However, Le Pennec does not explicitly teach with a binary tree where each node performs a one-dimensional warped subband processing along a respective dimension d , with $1 < d < n$.

In the same field of endeavor, Washizawa teaches with a binary tree where each node performs a one-dimensional warped subband processing along a respective dimension d , with $1 < d < n$ (column 7 lines 9 -21; Washizawa teaches using a binary tree on images and is well-known and the art. It would have been obvious to use this method on wavelet coefficients).

Therefore, it would have been obvious for one having skill in the art at the time of the invention to modify the invention of Le Pennec with the invention of Washizawa. Binary trees are well-known to the invention of wavelet subband coding to provide an optimal level of image compression efficiency.

As per **claim 8**, Le Pennec discloses a signal processing method according to claim 1, wherein said signal warping grids are computed from a warping geometry defined by region parameters specifying a partition of a signal support into a plurality of regions and deformation parameters specifying geometrical deformation functions respectively associated with said regions, whereby the geometrical deformation function

associated with one of the regions provides positions of sampling points within said one of the regions (column 7 lines 60 – 65 and column 8 lines 26 – column 9 line 36).

As per **claim 12**, Le Pennec discloses a signal processing method according to claim 8, further comprising the step of applying a bandeletisation to said warped wavelet packet coefficients and wavelet packet warping grids, wherein said bandeletisation comprises computing bandelet coefficients by applying invertible one-dimensional decorrelation operators to said warped wavelet packet coefficients along selected directions of said wavelet packet warping grids (column 7 lines 60 – 66).

As per **claim 17**, Le Pennec discloses a signal processing method according to claim 12, further comprising the steps of:

(a) quantizing said bandelet coefficients to produce quantized bandelet coefficients (column 8 lines 2 - 5); and

(b) encoding said quantized bandelet coefficients and said region and deformation parameters into a multiplexed data stream suitable for storage in a storage medium or for transmission over a transmission medium, said multiplexed data stream being a compressed representation of an n-dimensional input signal from which the n-dimensional warped signal is computed (column 7 lines 64 – 67 and column 8 lines 2 – 5).

As per **claim 38**, Le Pennec discloses a method of processing n-dimensional digital signals, n being an integer at least equal to 1, comprising the steps of: (a) providing warped wavelet packet coefficients and wavelet packet warping grids; and (b)

computing a warped signal including n-dimensional warped coefficients and n-dimensional signal warping grids based on said warped wavelet packet coefficients and wavelet packet warping grids, with a binary tree where each node performs a one-dimensional inverse warped subband processing along a particular dimension d, with $1 < d < n$; and (c) applying an inverse warping operation to said warped signal to produce an output signal (column 7 lines 18 – 24 and column 8 lines 13 – 20).

As per **claim 44**, Le Pennec discloses a signal processing method according to claim 38, wherein the step of providing the warped wavelet packet coefficients and wavelet packet warping grids comprises: (a) obtaining bandelet coefficients (column 8 lines 11 – 13); (b) obtaining parameters defining a warping geometry (column 7 lines 60 – 63); (c) computing said wavelet packet warping grids from said warping geometry; and (d) computing said warped wavelet packet coefficients by applying an inverse bandeletisation to said bandelet coefficients, wherein said inverse bandeletisation comprises computing warped wavelet packet coefficients by applying inverse one-dimensional decorrelation operators to said bandelet coefficients, along selected directions of said wavelet packet warping grids (column 7 lines 55 – 67 and column 8 lines 13 - 20).

Regarding **claim 49**, arguments analogous to those presented for claims 17 and 44 are applicable for claim 49.

Regarding **claim 72**, arguments analogous to those presented for claim 17 are applicable for claim 72.

Regarding **claim 73**, arguments analogous to those presented for claim 17 and 44 are applicable for claim 73.

Regarding **claim 77**, arguments analogous to those presented for claim 17 are applicable for claim 77.

Regarding **claim 78**, arguments analogous to those presented for claims 17 and 44 are applicable for claim 78.

Allowable Subject Matter

6. Claims 11 and 26 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

/Marsha D. Banks-Harold/

Supervisory Patent Examiner, Art Unit 2482